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06/17/2008

EXAMINER

GAKH, YELENA G

ART UNIT

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1797

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/813,719	Applicant(s) BELL ET AL.	
	Examiner Yelena G. Gakh, Ph.D.	Art Unit 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 April 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4,8-14,17,18,22-33 and 35-45 is/are pending in the application.
- 4a) Of the above claim(s) 22-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4,8-14,17,18,32,33 and 35-38 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Amendment filed on 04/17/08 is acknowledged. Claims 5-7, 15-16, 19-21 and 34 are cancelled. Thus, claims 1-4, 8-14, 17-18, 22-33 and 35-45 (rather than claims 1-45) are pending in the application. Claims 22-31 are withdrawn from consideration. Claims 1-4, 8-14, 17-18 and 32-33 and 35-38 are considered on merits as drawn to the elected invention.

Response to Amendment

2. In response to the amendment the examiner modifies rejections established in the previous Office action.

Information Disclosure Statement

3. Information Disclosure statement filed on 01/13/06 does not have any apparent relation to the subject matter of the instant disclosure. Clarification is required.

Claim Objections

4. Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 10 recites taking at least one core sample from the region of said formation, which is inherent to the parent claim, since the parent claim recites analyzing the formation, which inherently requires taking the sample for analysis.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-4, 8-14, 17-18 and 32-33 and 35-38 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

MPEP §2163 [R-5] "Guidelines for the Examination of Patent Applications Under the

Art Unit: 1797

35 U.S.C. 112, paragraph 1, "Written Description" Requirement" states:

"The written description requirement has several policy objectives "[T]he essential goal' of the description of the invention requirement is to clearly convey the information that an applicant has invented the subject matter which is claimed." *In re Barker*, 559 F.2d 588, 592 n.4, 194 USPQ 470, 473 n.4 (CCPA 1977). Another objective is to put the public in possession of what the applicant claims as the invention. See *Regents of the University of California v. Eli Lilly*, 119 F.3d 1559, 1566, 43 USPQ2d 1398, 1404 (Fed. Cir. 1997), cert. denied, 523 U.S. 1089 (1998). *>" The written description ' requirement implements the principle that a patent must describe the technology that is sought to be patented; the requirement serves both to satisfy the inventor 's obligation to disclose the technologic knowledge upon which the patent is based, and to demonstrate that the patentee was in possession of the invention that is claimed." *Capon v. Eshhar*, 418 F.3d 1349, 1357, 76 USPQ2d 1078, 1084 (Fed. Cir. 2005). Further, the< written description requirement ** promotes the progress of the useful arts by ensuring that patentees adequately describe their inventions in their patent specifications in exchange for the right to exclude others from practicing the invention for the duration of the patent's term. To satisfy the written description requirement, a patent specification must describe the claimed invention in sufficient detail that one skilled in the art can reasonably conclude that the inventor had possession of the claimed invention. See, e.g., *Moba, B.V. v. Diamond Automation, Inc.*, 325 F.3d 1306, 1319, 66 USPQ2d 1429, 1438 (Fed. Cir. 2003); *Vas-Cath, Inc. v. Mahurkar*, 935 F.2d at 1563, 19 USPQ2d at 1116".

Currently amended claim 1 recites:

A method of distinguishing oil based drilling fluid from subterranean formation fluid hydrocarbons during nuclear magnetic resonance testing while drilling a borehole in the subterranean formation, said method comprising adding paramagnetic species to the drilling fluid and circulating the drilling fluid containing the paramagnetic species in the borehole prior to said testing, wherein the testing comprises logging the borehole and taking nuclear magnetic resonance measurements of the subterranean formation during the logging.

The specification discloses:

"[0007] Filtration of such drilling fluids into the formation is a nuisance for NMR well logging operations. To prevent such filtration from distorting the results, core samples of the formation for laboratory testing must be taken at extended distances from the borehole in hopes that the drilling fluid filtrate has not reached that region of investigation and/or logging techniques must be used for differentiating the signals of the drilling fluid from those of the formation fluids. Several such techniques have been successfully practiced in wells drilled with water based drilling fluids. However, the contrast in the NMR tool response between oil-based drilling fluids and the formation oil can be very small, even below the noise level of the tool. Consequently, in wells drilled with oil-based fluids, drilling fluid filtration makes detection of hydrocarbons and estimation of residual oil saturation in the formation especially difficult or even impossible with NMR tools."

The problem of intermixing the drilling oil-based fluid and the formation hydrocarbons is also indicated in the prior art, see Ramakrishnan et al. (US 7,134,500), "when a well is drilled with oil-based-mud (OBM) the filtrate may miscibly mix with the formation fluid" (see col. 1, lines 48-50). It is well known for a person of ordinary skill in the art (as well as for a person

skilled in the art and for an expert in the art) that the presence of even traces of paramagnetic impurities in the sample leads to a significant broadening of NMR spectral lines.

The specification does not disclose, as to how it is possible to distinguish oil based drilling fluid comprising paramagnetic species from subterranean formation fluid hydrocarbons, when the oil based drilling fluid readily intermixes with the formation hydrocarbons, with the latter being susceptible to exactly the same influence of paramagnetic species, as the drilling fluid, and with the same effect of paramagnetic species on the NMR spectra lines, as for the oil drilling fluid.

MPEP further reads: "An application specification may show actual reduction to practice by describing testing of the claimed invention".

The instant disclosure comprises working examples. However, the working examples are irrelevant to the claimed invention, since the examples are directed toward observation of expected broadening of NMR spectral lines for a pure synthetic oil-based drilling fluid upon adding paramagnetic species, with the broadening proportional to the concentration of the paramagnetic species. It is not related to the *"method of distinguishing oil based drilling fluid from subterranean formation fluid hydrocarbons during nuclear magnetic resonance testing while drilling a borehole in the subterranean formation, said method comprising adding paramagnetic species to the drilling fluid and circulating the drilling fluid containing the paramagnetic species in the borehole prior to said testing, wherein the testing comprises logging the borehole and taking nuclear magnetic resonance measurements of the subterranean formation during the logging."* Therefore, the examples do not demonstrate a possibility of "distinguishing oil based drilling fluid from subterranean formation fluid", as recited in claim 1, and thus the specification does not show *"actual"* reduction to practice by describing testing of the claimed invention".

Furthermore, the specification discloses the following:

"[0009] The present invention provides a nuclear magnetic resonance (NMR) method for detecting the presence and preferably also the amount of any invasion or filtration of oil-based drilling fluid into a subterranean formation from a borehole penetrating the formation and drilled with the drilling fluid. That is, the present invention provides a method for distinguishing native or residual hydrocarbons in a formation from oil-based drilling fluid so that the drilling fluid does not distort the detection or measurement of such hydrocarbons using nuclear magnetic resonance."

Art Unit: 1797

"[0021] In the present invention, a method is provided for enhancing the contrast in the NMR tool response between oil-based drilling fluids and the formation oil so that hydrocarbons may be detected, oil or residual oil saturation determined, and/or contamination by drilling fluid in the formation, may be analyzed with NMR tools."

The specification is silent regarding "a method of detecting hydrocarbon-bearing zones in a formation penetrated by a borehole" as recited in claims 8-10, "a method of detecting or identifying characteristics of hydrocarbons in the formation surrounding a borehole drilled with oil-based drilling fluid" as claimed in claims 11-13, "a process of analyzing the fluid composition of a subterranean formation" as claimed in claims 14-18, or "a method of drilling a borehole in a subterranean formation" as claimed in claims 32-33, 35-37.

Furthermore, the scope of claims 32-33, and 35-37 is not supported by the scope of the specification disclosure. MPEP §2163 states that:

"The analysis of whether the specification complies with the written description requirement calls for the examiner to compare the scope of the claim with the scope of the description to determine whether applicant has demonstrated possession of the claimed invention."

A method of drilling a borehole with adding paramagnetic species into the oil-drilling fluid is much broader in the scope than the method, disclosed in the specification and specifically directed toward NMR analysis of the oil-based drilling fluid. Therefore, "a person skilled in the art at the time the application was filed would not have recognized that the inventor was in possession of the invention as claimed in view of the disclosure of the application as filed."

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-4, 8-14, 17-18 and 32-33 and 35-38 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites "a method of distinguishing oil based drilling fluid from subterranean formation fluid" by adding paramagnetic species to the oil drilling fluid and taking NMR spectrum of the subterranean formation. It is not apparent, as to how these two steps - adding paramagnetic fluid to one liquid and taking NMR spectra of another liquid allows distinguishing these liquids from each other? The claim appears to be missing some essential information in the

Art Unit: 1797

last step of the claim, which would relate these steps to each other and with the preamble of the claim.

Claim 14 recites "a process of analyzing the fluid composition of a subterranean formation". Conventionally subterranean formations are complex mixtures of hydrocarbons with overlapping signals in NMR spectra. It is unclear from the claim, as to what is meant by the expression "analyzing the fluid composition of a subterranean formation", since the specification does not provide any disclosure for this type of analysis, which makes it unclear, as to what is meant by the expression, and which are metes and bounds of the subject matter of the claim. The examiner respectfully reminds the Applicants, that according to the second paragraph of 35 U.S.C. 112, "[t]here are two separate requirements set forth in this paragraph: (A) the claims must set forth the subject matter that applicants regard as their invention; and (B) the claims must particularly point out and distinctly define the metes and bounds of the subject matter that will be protected by the patent grant."

Claim 32 recites a method of drilling a borehole by adding paramagnetic species into the oil-based drilling fluid, which does not "particularly point out and distinctly claim the subject matter which the applicant regards as his invention", since the specification does not disclose adding paramagnetic species into the oil-based drilling fluid as the subject matter that the Applicants consider as their invention. Claims 32-37 are rejected as dependent claims from claim 32.

Claim Rejections - 35 USC § 102/103

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

12. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

13. **Claims 1-4, 8-14, 17-18 and 32-33 and 35-38** rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Kleinberg (US 6,346,813).

Kleinberg discloses “magnetic resonance method for characterizing fluid samples withdrawn from subsurface formations” (Title) and teaches, “[d]issolved paramagnetic compounds will reduce the proton relaxation times of oils. Thus if two oils have the same viscosity, they will have different relaxation times if they have substantially different paramagnetic content. While many crude oils and most oil base mud filtrates have negligible magnetic content, some crude oils have significant amounts of vanadium or nickel [Tissot and Welte, "Petroleum Formation and Occurrence", Springer-Verlag, 1978, Figure IV.1.20]. Because the relaxation effect is proportional to paramagnetic concentration, the proportions of two oils in a mixture can be monitored. *Deliberate introduction of an oil-soluble paramagnetic substance into the oil base mud can considerably enhance this effect when the native crude is relatively free of paramagnetic material*” (col. 8, lines 5-18). Kleinberg specifically indicates that paramagnetic substances are salts of the transition metals: “[u]npaired electrons are found in naturally occurring or *artificially introduced magnetic transition metal ions such as iron, manganese,*

chromium, cobalt, vanadium and nickel. These last two are frequently found in crude oils. Chromium is found at high concentration in a number of water base mud filtrates. Natural ground water has significant iron content. In general, mud filtrates and formation fluids will have different concentrations of transition metal ions” (col. 9, lines 31-37).

Thus Kleinberg teaches adding oil-soluble paramagnetic species into the oil-based drilling mud during drilling operation (with inherent circulation of the fluid in the borehole) and differentiating the mud from the formation fluid using NMR spectra by determining different values of relaxation parameters of NMR spectra of the mud and the formation, which covers the subject matter of the indicated claims; the claims directed toward detecting hydrocarbon-bearing zones are obvious in the light of differentiating between the oil-based mud with added paramagnetic species and hydrocarbon fluid formation with NMR spectroscopy.

Response to Arguments

14. Applicant's arguments filed 04/17/08 have been fully considered but they are not persuasive. First, the examiner respectfully reminds the Applicants that they did not respond to the issue raised by the examiner regarding submitted IDS. The Applicants either have to withdrawn submitted IDS, or explain its relevance to the instant application.

Warning regarding double patenting is withdrawn.

Regarding rejections of the pending claims under 112, first paragraph, the examiner respectfully indicates to the Applicants, that the claims were not rejected under enablement requirements (MPEP §2164), but rather under written description requirements (MPEP §2163), and therefore the reference to MPEP §2164 is irrelevant to the rejections. The examiner provided a more detailed explanation of the rejection under this paragraph in the present Office action. Furthermore, the Applicants refer multiple times to the MPEP excerpt which indicates that "a patent need not teach, and preferably omits, what is well known in the art". However, the examiner applied the rejection to the subject matter of the pending claims, which recite the claimed invention. If the Applicants consider the claimed subject matter "well known in the art", the examiner will take this statement as the Applicants' admission that what is claimed is well known in the art. The examiner respectfully requests the Applicants to elaborate this statement.

Regarding the Applicants conclusion that the examiner suggested using proprietary samples of pure hydrocarbon formation fluid, the examiner is not quite sure, as to how this

Art Unit: 1797

conclusion was derived. The examiner indicated that because of the intermixing of the oil-based drilling fluid and the formation fluid in the borehole, it appears that the only comparison that could be done for NMR spectra of these two fluids would be taking spectra of each of these fluids in a pure form. As for the proprietary samples - if no NMR spectra can be taken for the hydrocarbon formation fluid, it's not apparent, as to how the present invention can be practiced. Regarding distinction of the fluids, the examiner specifically inquired the Applicants to demonstrate, as to how freely intermixed liquids can be distinguished, if one has paramagnetic species, and the other does not, because upon intermixing both fluids will be affected by added paramagnetic species.

As to the rejection of claims 8-10, which is now modified in light of the amendment, the Applicants again refer to the enablement rejections, rather than the rejections under written description requirements. Furthermore, the Applicants "respectfully submit that the Examiner's statements demonstrate that she is not one skilled in the art of the present invention". The examiner respectfully requests the Applicants to elaborate this submission, as it is not apparent, as to which specific examiner's statements led the Applicants to such conclusion. In response the examiner would like to indicate that she possesses PhD specifically in NMR spectroscopy and has over 20 years experience of working in some leading NMR laboratories of the country. Furthermore, she has several publications in peer-reviewed journals related to NMR studies involving paramagnetic lanthanide shift reagents. It is not quite clear, as to whom the Applicants would consider "one skilled in the art of the present invention". If the Applicants believe that the examiner omitted some essential information from the Applicants' disclosure, the examiner respectfully requests the Applicants to indicate specifically, what this information is.

The Applicants' arguments related to the scope of enablement are moot in light of their withdrawal from the present Office action. However, the examiner would like to indicate, that while the claimed invention may comprise some un-enabled embodiments, it is not equivalent to the invention being enabled only under specific circumstances, which was the case for the instant invention, as was presented in the previous Office action.

The Applicants' arguments regarding rejections under 112, second paragraph do not seem to be very logical in view of quite extensive amendments provided by the Applicants and based on these rejections. The examiner would like to mention, that if the meaning of the claims were

clear in light of the specification, the examiner would not raise the question of unclarity and indefiniteness. The language of the claims was not definite and clear, and the reasons for such indefiniteness and unclarity were clearly and definitely expressed in the previous Office action. The rejections are modified in the present Office action in light of the amendment. Regarding claim 14, the rejection for which is sustained the way it was established in the previous Office action, the examiner indicates that the claim is not clear and definite in respect to the term "analyzing the fluid composition". According to MPEP §2165.04, "[t]here are two separate requirements set forth in this paragraph: (A) the claims must set forth the subject matter that applicants regard as their invention; and (B) the claims must particularly point out and distinctly define the metes and bounds of the subject matter that will be protected by the patent grant." The examiner states, that in light of the specification, it is not clear, as to what the Applicants meant by the term "analyzing the fluid composition", since the examiner did not find any disclosure related to analyzing the fluid composition by the inventive method.

Rejection over the prior art. In this section the examiner failed to find any arguments offered by the Applicants in relation to the cited prior art. The Applicants have cited quite a significant portion of the examiner's description of Kleiberg's disclosure from the previous Office action, and provided a non-supported statement that "the Kleinberg reference does not have such identity and therefore cannot anticipate Applicants' invention as claimed". The examiner expects the Applicants to perform a comparative analysis of the claimed subject matter of the instant application vs. the disclosure presented by the examiner as 102/103 reference, with specific indication of distinctions between these disclosures. To the examiner understanding the Kleiberg's disclosure fully covers the subject matter of the pending claims or is their obvious modification.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

Art Unit: 1797

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yelena G. Gakh/
Primary Examiner, Art Unit 1797

06/11/2008